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Adaptation to the Cold**Grade Level: 9-12**

The cold, harsh Antarctic environment includes below-freezing temperatures year round, strong winds that exacerbate the effects of the cold, months of utter darkness and, conversely, total sunlight, little water, and a land mass that is ninety-eight-percent ice-encrusted. According to this University of Canterbury site, [o]nly tiny and primitive plants and animals can cope with these extremes. The surrounding ocean[,] though, is teeming with life. This discussion of adaptation to the cold...

Topic: Ecology--Antarctica**URL:** <http://www.anta.canterbury.ac.nz/resources/adapt.html>**Source:** Standards**Ecoregions: Boreal Forest Ecoregion****Grade Level: 6-8 9-12**

The northern boreal ecoregion accounts for about one third of this planet's total forest area. This region contains immense forests in a cold climate. Many types of conifer trees, such as pine, birch, and fir have adapted to this harsh region. But, human population and industrial developments such as logging and mining are threatening this immense wilderness. This site, hosted by the Sierra Club, offers important information about the boreal ecoregions and the necessity of protecting this...

Topic: Taigas**URL:** <http://www.sierraclub.org/ecoregions/boreal.asp>**Source:** Standards**Factsheet: Wildlife in Winter - Adaptations for Survival****Grade Level: 6-8 9-12**

To survive, plants and animals must fit in with--adapt to--their habitat: its temperature, air, soil, light, and other unique environmental conditions. If the habitat changes regularly--with the seasons, for example--the plants and animals must also adapt to those changes. The fact sheet at this site discusses the special adaptations made by plants and animals that live in harsh, cold conditions, including the polar regions. Some organisms discussed here include Arctic land mammals, the...

Topic: Cold adaptation**URL:** http://www.yptenc.org.uk/docs/factsheets/env_facts/wildlife_winter.html**Source:** Standards**HBOI- More About Bioluminescence****Grade Level: K-5 6-8**

Elementary and middle school students will be fascinated by the rare images of bioluminescent marine life offered by the Harbor Branch Oceanographic Institute. An explanation of which marine species exhibit bioluminescence is followed by a discussion of how marine creatures make the light which causes them to glow. Also explained are the reasons for bioluminescence, which include finding food, finding a mate, and self-defense. Additional information is provided about what scientists can...

Topic: Bioluminescence**URL:** <http://www.biolum.org/>**Source:** Standards**Heat Acclimatization****Grade Level: 6-8 9-12**

The Encyclopedia of Sports Medicine and Science explains heat acclimatization. When a person exercises in a hot environment, there is an improvement in the physiologic responses of healthy humans. This improved tolerance to exercise in heat is known as heat acclimatization. The benefit of heat acclimatization improves the body's tolerance of exercise in the heat. This reduces the incidence of symptoms of heat illness, with reduced thermal and metabolic strain. A chart is available of...

Topic: Environmental influence on humans

URL: <http://www.sportsci.org/encyc/heataccl/heataccl.html>

Source: Standards

How Animal Camouflage Works: Color Change

Grade Level: 6-8 9-12

Adaptations allow many animal species to change colors with seasonal changes in their environment. A mammal may brown fur in the summer and white fur in the winter. Changes in daylight or temperature trigger biochrome production. Reptiles, amphibians, and fish often have chromatophores in their skin that affect coloration. The animal constricts and relaxes certain chromatophores to change skin color in order to communicate, express mood, or camouflage. Nudibranchs acquire their color...

Topic: Camouflage (Biology)

URL: <http://www.howstuffworks.com/animal-camouflage2.htm>

Source: Standards

Living at Extremes

Grade Level: K-5 6-8

In the dark, poisonous environment of a hydrothermal vent, a unique ecosystem survives. These organisms do not seem to rely on plants or photosynthesis, but on chemosynthesis. Chemicals from inside the Earth become food for bacteria, which is food for snails that get eaten by tubeworms. This environment can be extremely hot or cold. It can be so acidic that snails cannot form shells. The high pressure of the deep sea requires adaptations, and vent animals must be able to find their ways to...

Topic: Hydrothermal vents

URL: <http://www.pbs.org/wgbh/nova/abyss/life/extremes.html>

Source: Standards

More Species Slide to Extinction

Grade Level: 6-8 9-12

The World Conservation Union (IUCN) regularly measures the livelihood of the plant, animal, and fungi kingdoms, and reports the results in a survey called the Red List of Threatened Species. This article explains what the Red List is, how researchers determine if a species is in danger, and includes recent updates to the list. Currently, the list names more than 16,000 at-risk species, including new additions: the polar bear and the hippopotamus. Sidebars list common threats to endangered...

Topic: Endangered species

URL: <http://news.bbc.co.uk/2/hi/science/nature/4963526.stm>

Source: Standards

Sea Chameleons

Grade Level: 6-8

Octopuses can change their color to blend in with their environment or display their mood. Some even have bioluminescent, or glow-in-the-dark, tentacles. These may have been an adaptation for living in a deep sea environment. Glowing to attract prey, the muscles of these tentacles no longer stick to objects. Within their skin cells, octopuses have chromatophores containing three colors, which can be combined or can produce bright bursts of color. An octopus' color can communicate fear,...

Topic: Camouflage (Biology)

URL: <http://www.pbs.org/wnet/nature/octopus/chameleons.html>

Source: Standards